

## Measurement of Quality in Preschool Child Care Classrooms

Deborah J. Cassidy, Ph.D., Linda L. Hestenes, Ph.D., Stephen Hestenes, Ph.D.  
and Sharon Mims, M.S.

Department of Human Development and Family Studies  
The University of North Carolina at Greensboro

The Early Childhood Environment Rating Scale-Revised (Harms, Clifford, & Cryer, 1998) is perhaps the most frequently used measure of process quality in early childhood settings. Earlier research with the original ECERS revealed one (Scarr, Eisenberg, & Deater-Deckard, 1994) or two factors (Howes, Phillips, & Whitebook, 1992). More recent research with the revised version yielded only one factor (Holloway, Kagan, Fuller, Tsou, & Carroll, 2001). However, the Holloway, et. al research was conducted on only 92 preschool classrooms via telephone interviews with teachers. The purpose of the current study was to examine the revised ECERS with a large sample (1313 classrooms) to determine the factors present. In addition, regulatable aspects of child care quality were examined to determine the relationship between the ECERS-R factors and teacher education, experience, group sizes, and teacher/child ratios.

### Method

Data were collected from 1313 preschool classrooms in child care programs across North Carolina. Trained assessors completed the Early Childhood Environment Rating Scale-Revised (ECERS-R) in each classroom. This 43-item observational instrument is completed during a 3 to 4 hour observation. Each item is rated from 1 (inadequate) to 7 (excellent). The scale contains 7 subscales: Space and Furnishings, Personal Care Routines, Activities, Interaction, Program Structure, and Parents and Staff. This assessment was completed as part of North Carolina's Star Rated License process. Assessments were completed only in programs that were striving for the higher star ratings (typically 4 or 5 stars). Thus, this data set represents only the higher quality programs in the state. In addition to completing the ECERS-R, assessors also collected background information on teachers, group size, and teacher-child ratios during their observation. Teachers' level of education was coded into one of 12 categories from 'did not complete high school' to a 'graduate degree'. Inter-rater reliability was established and maintained at 85% or better.

### Results

An initial principal components analysis on the 1313 preschool classrooms yielded a solution that had 10 components with an eigenvalue greater than 1 and explained 51% of the variance. Examination of the eigenvalues, scree plot, item loadings (greater than .5), and correlational matrices led to the examination of a two-component solution both with and without varimax rotation. The two-component solution with varimax rotation revealed a conceptually clearer categorization of the items. All items that were not distinct in their loading (loaded at .35 or higher on one factor and below .5 on the other factor), or loaded below .5 were dropped from consideration and the analysis rerun. The results revealed two factors. The first factor (Materials/Activities) included 10 items and accounted for 36% of the variance and the second factor (Interactions) included 7 items and accounted for an additional 12% of the variance (see Table 1). The Cronbach alphas for the factors were .87 and .81, respectively. The correlation between Factor 1 and the overall ECERS-R scores was .80 and .79 for Factor 2 and the overall score. The correlation between the two factors was .47.

In order to replicate Scarr, et al.'s (1994) findings that the original ECERS could be reduced to a single factor scale represented by any 12 items ( $\alpha = .90$ ), a similar analysis was conducted with 3 randomly selected subsets of 12-items. The Cronbach alphas for these three subscales were .68, .59, and .65 respectively. The ECERS-R does not seem to be reducible to a single factor with fewer items in the same manner as the original scale.

Relationships between the two new components, the overall ECERS-R score and the structural variables of teacher education, teacher-child ratio, group size, and years of experience in early childhood were analyzed (see Table 3). Results revealed a significant correlation between education and the overall ECERS-R scores as well as between education and the two factors of the scale. The 12 levels of education were collapsed in 6 levels: high school, some college, 2-year degree, 4-year degree (related field), 4-year degree in CD/ECE, and graduate coursework. Post hoc multiple comparison tests on the ECERS-R revealed significant differences between a high school degree and all higher levels of education as well as between some college and all higher levels of education. However, no significant differences were found between a community college degree and a 4-year degree or graduate work for overall ECERS-R means or the Materials/Activities factor. The Interaction factor scores were also significantly different for education levels of a community college degree or higher and lower levels of education (high school and some college). Teacher-child ratios, group size, and experience were significantly correlated with overall ECERS-R scores, although the correlations were quite low. Teacher-child ratios, and experience were also significantly correlated with both factors although, once again, the correlations were not strong.

## Discussion

The findings from this study are somewhat inconsistent with factor analyses of the earlier version of the ECERS that revealed only one factor that explained 69% (Scarr, et al., 1994) of the variance or two factors explaining 100% of the variance (Howes, et al., 1992). In addition, the factor analysis of the ECERS-R conducted by Holloway, et al revealed one factor explaining only 27% of the variance. Consistent with the Holloway, et al findings the first factor in our factor analysis also does not seem to consume the majority of the variance as it did in analyses of the original scale. Furthermore, as predicted by Scarr, et. al., when the scale is used in higher quality programs (as in the current study) the initial factor does not "swamp" other factors, since it accounts for only 36% of the variance.

The original factor analysis conducted by Howe and colleagues revealed an "appropriate caregiving" scale that explained 52% of the variance, far exceeding the 12% of the variance explained by the interaction factor in the revised ECERS. Furthermore, the Howes, et al factor analysis also revealed an "appropriate activity" factor that explained an additional 48% of the variance. In the current study, the revised ECERS factor analysis revealed a similar "activities/materials" factor that includes 7 of the 10 items from the "activities" subscale and explained 36% of the variance.

The current findings also reveal a more parsimonious interaction factor than the original factor analysis that includes all 5 items of the Interaction subscale and two additional items ("encouraging children to communicate" and "informal use of language") that arguably could be considered "interaction" items. Therefore, the subscales may have been revised to be more cohesive as indicated by the number of items included from the subscales in the two factors.

Although the relationship between education and global quality has long been reported in the literature, the relationship between the factors and level of education reveals an interesting trend. The range for the Interaction factor from High School to a Graduate degree is 5.4-5.7, indicating rather inflated scores on those items. The Materials/Activities factor had a range of

4.4-5.1, a more appropriate range on a 7-point scale. Either the interaction factor (and subscale) does not seem to differentiate among levels of education OR education does not make much of a difference in teacher interactions. Future longitudinal research, which examines teacher-child interaction in relation to education level, would serve to further clarify this finding.

References

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Table 1. Item Loadings for the Materials/Activities and Interaction Components

|                                       | <i>Materials and<br/>Activities</i> | <i>Interactions</i> |
|---------------------------------------|-------------------------------------|---------------------|
| Fine Motor                            | <b>.77</b>                          | .08                 |
| Art                                   | <b>.76</b>                          | .16                 |
| Math/Number                           | <b>.73</b>                          | .18                 |
| Nature/Science                        | <b>.73</b>                          | .18                 |
| Dramatic Play                         | <b>.68</b>                          | .08                 |
| Furnishing for Relaxation             | <b>.66</b>                          | .20                 |
| Blocks                                | <b>.61</b>                          | .14                 |
| Space for Privacy                     | <b>.60</b>                          | .20                 |
| Books and Pictures                    | <b>.59</b>                          | .20                 |
| Sand/Waters                           | <b>.41</b>                          | .28                 |
| Staff-child Interactions              | .13                                 | <b>.77</b>          |
| Discipline                            | .23                                 | <b>.77</b>          |
| Interactions among Children           | .18                                 | <b>.74</b>          |
| General Supervision of Children       | .08                                 | <b>.69</b>          |
| Informal Use of Language              | .25                                 | <b>.66</b>          |
| Encouraging Children to Communicate   | .32                                 | <b>.54</b>          |
| Supervision of Gross Motor Activities | .07                                 | <b>.48</b>          |

*\*loadings <.32 not shown*

Table 2: Child Development Environmental Factors (from Whitebook, Howes, & Phillips, 1989)

|                                    | <i>Preschool<br/>Appropriate<br/>Caregiving</i> | <i>Preschool<br/>Developmentally<br/>Appropriate<br/>Activity</i> |
|------------------------------------|---|---|
| Greetings/departure                | <b>.63</b>                                      |   |
| Meals/Snacks                       | <b>.67</b>                                      |   |
| Nap/Rest                           | <b>.63</b>                                      |   |
| Diapering/Toileting                | <b>.57</b>                                      |   |
| Understanding Language             | <b>.79</b>                                      |   |
| Using Language                     | <b>.83</b>                                      |   |
| Reasoning                          | <b>.77</b>                                      |   |
| Informal Language                  | <b>.78</b>                                      |   |
| Supervision - Fine Motor           | <b>.8</b>                                       |   |
| Supervision - Gross Motor          | <b>.68</b>                                      |   |
| Music/Movement Activities          | <b>.6</b>                                       |   |
| Schedule of Creative Activities    | <b>.71</b>                                      |   |
| Supervision of Creative Activities | <b>.7</b>                                       |   |
| Free Play                          | <b>.78</b>                                      |   |
| Group Time                         | <b>.72</b>                                      |   |
| Tone of Interactions               | <b>.79</b>                                      |   |
| Furnishings for Learning           |   | <b>.71</b>  |
| Furnishing for Relaxation          |   | <b>.70</b>  |
| Room Arrangement                   |   | <b>.85</b>  |
| Fine Motor Activities              |   | <b>.73</b>  |
| Art Activities                     |   | <b>.74</b>  |
| Block Activities                   |   | <b>.78</b>  |
| Sand and Water Activities          |   | <b>.68</b>  |
| Dramatic Play                      |   | <b>.66</b>  |
| Space to be Alone                  |   | <b>.63</b>  |
| Cultural Awareness Activities      |   | <b>.51</b>  |

Source: Whitebook, M., Howes, C., & Phillips, D. (1989). Who cares? Child care teachers and the quality of care in America. National child care staffing study. Oakland: Child Care Employee Project.

Table 3. Correlations between new components, total score, and regulatable variables

| Regulatable Variables                  | Materials/Activities<br>Component | Interaction<br>Component | Total Score<br>ECERS-R |
|--|-----------------------------------|--------------------------|------------------------|
| Teacher Education (12 levels)          | .27**                             | .21**                    | .29**                  |
| Years Experience in Early<br>Childhood | .08**                             | .12**                    | .13**                  |
| Group Size                             | .07                               | .02                      | .08**                  |
| Teacher-Child Ratio                    | -.13**                            | -.15**                   | -.15**                 |

\*\* Significant at  $p < .01$

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